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ABSTRACT

The National Teachers Examination (NTE) core battery tests are designed to be an objective measure of academic achievement for students entering teacher education programs (Parts I and II) and for seniors completing such programs (Part III). Passing these tests at specified levels is a requirement in North Carolina. While the cut-off scores for Parts I and II are relatively low, the cut-off score for Part III, the test of professional knowledge, is substantially higher. To address this problem, a department of education and the institutional research office of North Carolina Central University developed a procedure for identifying students who would pass Parts I and II but would be in danger of falling below the cut-off level on Part III. The purpose was to provide counseling and other assistance for those students as they prepare to take Part III of the test. By examining students' test scores and grades on the four required education methods courses, a data set of 64 students was identified, and multiple regression analyses were computed to determine the best combination of variables to predict Core Battery III (Part III) scores. The formula was then applied to other education students, and an extremely high correlation was found between the actual and the predicted Core Battery III scores. The meaning of the results and the potential use of the formula in aiding students is discussed. (KM)

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PREDICTING STUDENT PERFORMANCE

on the

PROFESSIONAL KNOWLEDGE PORTION OF THE NTE CORE BATTERY

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ABSTRACT

Predicting Student Performance

on the

Professional Knowledge Portion of the NTE Core Battery

The rapid increase in the requirements for various forms of student outcomes assessment, particularly in the Southern states, as well as the particular requirements associated with admission to teacher education programs and for teacher certification in North Carolina led to this study. A cooperative project between a department of education and an institutional research office led to the development of a regression formula for predicting student performance on the third portion of the NTE Core Battery. The process of cooperative development of such prediction procedures may well become increasingly important in the next several years.

Predicting Student Performance
on the
Professional Knowledge Portion of the NTE Core Battery

In 1984, the Southern Regional Educational Board published a monograph, Measuring Educational Progress in the South: Student Achievement, which documented increasing emphasis on testing and other forms of assessment in the South. At that time, fourteen Southern states had formal, state-wide assessment programs for elementary and secondary level students. In Alabama, Florida, Georgia, Maryland, North Carolina, Tennessee, and Virginia these programs included assessment of minimum skills for high school graduation.

With the exception of requiring submission of Scholastic Aptitude Test (SAT) scores or American College Test (ACT) scores by applicants for undergraduate admissions, assessment practices in Southern colleges and universities are neither uniform nor comprehensive. However, many states, notably Tennessee, Florida and Georgia do have comprehensive assessment programs for continuing students and the number of these state mandated programs are likely to increase. In addition, the Criteria for Accreditation of the Commission on Colleges of the Southern Association of Colleges and Schools (SACS) includes requirements for assessment of outcomes, including student outcomes, that will require individual colleges to develop assessment procedures for their own students.

The Educational Testing Service's (ETS) newsletter Collaborations (Fall, 1985) reported that the progress of Black students through the education system resembled an inverted pyramid with Black youths representing 12.7% of the total 18 year olds in the United States in 1972, 10.5% of the high school graduates, 8.7% of the first year college students, 6.5% of the baccalaureate degree recipients and only 4% of the students enrolled in professional or Ph.D. programs during the 1979 school year. Thus the loss of students as this cohort progressed through the system was dramatic. The number of Black students progressing to graduate and professional programs in future years is likely to be even smaller since college attendance and completion rates have dropped steadily for Blacks since 1975. Further, the newsletter indicates that:

> Black college-bound seniors in 1981 took fewer years of coursework in mathematics, physical sciences, and social studies than their White peers. Moreover, while number of years of coursework is similar, course content tends to differ. For example, according to the report, "Black seniors in 1980 were as likely as Whites to have taken at least three years of math, but they were much less likely to have taken algebra, geometry, trigonometry or calculus. Thus, their years of course work must have been concentrated in areas like general math or business math."
>
> The report [on which the newsletter report was based] further states that the serious problems of Black students are likely to be exacerbated in the coming years by emerging policy trends (ETS, 1985).

One policy trend that is a potential problem, one that may limit Black access to higher education and to graduate and professional programs in particular, is the increasing emphasis

on assessing student outcomes through the testing of continuing students. This may take the form of "rising junior tests" (SREB, 1984) as it has in Florida and in Georgia, or the practice may be limited to admission of students into specific programs.

The practice of testing students as "rising juniors" or for admission to specific programs is now practiced more frequently. Sandifer (1985) reported that, as of 1983, 30 states had some form of state mandated competency assessment of teachers. In 17 states, assessment has taken the form of testing prior to admissions (presumably formal admission to a teacher education program) while 25 states required assessment prior to certification. Twelve states require assessment at both levels. Eighteen of the thirty states use some form of nationally standardized tests for their program while sixteen use customized instruments. Four states use both a nationally standardized and a customized instrument.

North Carolina is one of the twelve states that require assessment both prior to formally entering teacher education programs and prior to receiving certification. Legislation passed by the North Carolina General Assembly requires tests to be used to certify teachers for employment in the public schools. The State Board of Education in North Carolina selected the National Teachers Examination (NTE). Specifically, students must score at the levels established by the Board of Education on Core Batteries I and II (Communications Skills and General Knowledge, respectively) prior to formal admission to a teacher education

program at any public or private college or university in North Carolina. Students must score at the state mandated level on the Core Battery III of the NTE (the Professional Knowledge portion) as well as scoring at the prescribed level on the NTE area test in their area of specialty. The requirements for the three sections of the Core Battery became effective in 1983 as part of the Quality Assurance Program which was established by the State Board of Education and endorsed by the Board of Governors of The University of North Carolina.

The NTE Core Battery Tests (Educational Testing Service, 1984) were introduced in November of 1982. This set of standardized examinations is designed to be an objective measure of academic achievement for students entering teacher education programs (Parts I and II) and for seniors completing such programs (Part III). Part I is a test of communications skills assessing abilities in listening, reading and writing. Core Battery II is a test of general knowledge in the areas of literature and fine arts, mathematics, science and social studies. The Core Battery III is a test of professional knowledge, specifically concerning the process of teaching and the context of teaching.

Currently, the cut-off scores for Core Batteries I and II are relatively low, while the cut-off score for passing the third portion of the Core Battery, the Professional Knowledge (PK) test, is substantially higher. Since students must pass the PK test prior to being certified to teach in North Carolina, this is

a potential problem. Students may well pass the Communication Skills (CS) and General Knowledge (GK) tests, be admitted to a program and complete all graduation requirements and yet not be eligible for certification in the State of North Carolina.

To address this problem, the Institutional Research Office and the Director of the Undergraduate Elementary Education Program at North Carolina Central University explored the possibility of developing a procedure for identifying students who, although achieving the state passing scores on Core Battery I and II might be in danger of falling below the state-mandated cutoff score on Core Battery III. The purpose of this process was not to eliminate such students from the program but to provide counseling and other assistance for students as they prepare to take the third portion of the Core Battery. This purpose is in line with Section B--Standards Relating to Teacher Education Policies and Procedures, Section 4.0 -Retention in Teacher Education Programs, Part 4.1 of the National Council on the Accreditation of Teacher Education (NCATE) which specifies that programs must have:

> 4.1 Clearly defined standards, criteria and procedures for evaluating student performance at various stages within the programs leading to initial and advanced level certification are established and systematically applied to determine retention in the program. This assumes that some students may be advised or systematically counseled out of the program into other areas of study. (NCATE, 1982)

Although this process was concerned with a specific problem in one institution, the process of identifying a specific problem related to an assessment procedure and of developing a response

that is useful to the institution and helpful to the student may be applicable to other institutions and to other assessment areas.

Subjects

The students included in the sample were undergraduate students at North Carolina Central University, a predominantly Black campus of The University of North Carolina. All of those included in the sample had indicated an interest in majoring in Elementary Education or were majoring in other fields but seeking teacher certification at the secondary level. Student scores on the three sections of the Core Battery of the NTE, and students' grades on the four education methods courses which are required of all students in Elementary and Secondary Education programs were collected between 1983 when the Core Battery was introduced and the summer of 1987. The final data set included 64 students who had completed all three portions of the Core Battery (CS, GK, and PK) and for whom grades were available for the first and, in all but a few cases, all four of the educational methods courses. As an indicator of the problem 61 students or 97% of these students passed the Communication Skills portion of the Core Battery and 62 students or 98% passed the General Knowledge portion, while only 61% of the students passed Core Battery III, the Professional Knowledge portion of the test.

Analytical Method and Results

Multiple regression analyses were computed to determine the best combination of variables to predict Core Battery III scores.

The Core Battery III scores were the criterion in all analyses and the Core Battery I (CS) and Core Battery II (GK) scores were used as predictors. Grades in the four courses were entered singly and in combination. The formula which yielded the best R² included the CS scores and the grades on Education 2000 (Introduction to Education) as predictors. This formula yielded an R² of .66. There were a total of 64 students in the data set used to compute this formula. Although the Core Battery I (CS) scores accounted for the larger portion of the variance, grades in the Introduction to Education course added significantly to the variance. The final formula was:

PK(Predicted)=164.26 + (.73*CS Score) + (3.48*Ed2000 Grade)

The formula was then applied to the Education students who completed graduation requirements but had not taken the PK early enough to be included in the original sample. There were 21 students in this category. These students' scores and grades were used to validate the formula. The correlation between the actual and the predicted NTE scores for this group was .89. Table 1 lists the students' actual and predicted PK scores. The formula correctly predicted those students who would achieve the cutoff score of 644 on the PK test and those who would fail to achieve that score in 16 of 21 cases. In each of the five cases where prediction was not correct, the predicted score was close enough to the cutoff that counseling would have been initiated. Two of the students with predicted scores below the cutoff actually achieved PK scores of 644 or above. Of the three

students predicted to achieve a score of 644 or above but having an actual score of below 644, two had predicted scores of exactly 644 and one had a predicted score of 645. The average absolute difference between the actual and the predicted PK scores was 5.32, with the largest differences occurring for students with high predicted and even higher actual PK scores.

TABLE 1

Comparison of Actual and Predicted PK Scores

Student	Actual Pk Score	Predicted PK Score
1	673	661*
2	671	659*
3	666	665*
4	663	653*
5	660	656*
6	660	654*
7	659	658*
8	650	655*
9	649	644*
10	649	639
11	645	651*
12	645	644*
13	644	639
14	642	644
15	642	643*
16	637	644
17	636	645
18	633	629*
19	632	636*
20	629	634*
21	629	629*

* Indicates cases where formula correctly predicted passing or failing based on state mandated cutoff score for PK.

Discussion and Implications

Although the correlation between the actual and the predicted Core Battery III (PK) scores was extremely high, this must be interpreted with caution. Nevertheless, since the

average difference between the predicted and the actual scores was so small, and since the R^2 was quite high, the Elementary Education program at NCCU is now using the formula to counsel students who are applying for formal admittance to the program. The intent is to advise those students who are predicted to have Core Battery III scores below or near the cutoff so that they can be identified for special efforts to assist them in achieving a PK score that will make them eligible for certification.

It is hoped that this early identification of students with potential problems will enable the students and the faculty to take steps to increase each student's chance of passing the PK test at the mandated level. Only in extreme cases, and using both the predicted Core Battery III scores and other information such as grades in the general college program and introductory education courses and the observations of faculty members, will students be advised to change majors.

The Education Department is in the process of a curriculum review that will include revision of course content and development of special seminars to strengthen the educational/professional sequence. While this process is occurring, students predicted to below or near the cutoff are counseled on an individual basis by faculty members.

This type of study is one that can be completed on almost any campus with an Institutional Research office, provided the need is apparent to the faculty of the program involved and provided that program will cooperate in providing data and

advice. The use of this and other methods of predicting the success of students on standardized tests may enable the various programs to identify students who may be in danger of being eliminated from the program because of test scores so that special remedial action can be taken or so that students can be advised to enter other programs where they have a better chance of success. It is not intended to be final screening device to eliminate students, but rather to be a means of early identification.

It is hoped that these and other methods will provide one means of stemming the loss of students, particularly minority students from exactly those programs where they are least represented and most needed. The national trend toward assessment at all levels of education will not be reversed, nor should it be. The role Institutional Research can play is to assist the various programs on our campuses to ensure that the benefits of such programs can be enjoyed without placing a special burden on any single group of students.

Summary

As testing programs assessing student outcomes increase in number because of public legislation and because of accrediting requirements, the need for efficient processes for predicting student performance on various required examinations will increase. This paper describes one such process, one that can readily be applied to other programs and other types of assessment.

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